

**UL and FCC Regulatory Issue
Analysis**

Report to F21

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Reference 46362

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The compliance of a product to the appropriate Underwriter Laboratory (UL) specification is a marketing not a legal requirement, whereas the Federal Communications Commission (FCC) portion of the Code of Federal Regulations (CFR) is a legal requirement.

- UL listing is required by many distribution and sales organizations before they will market a product in order to limit their own liability
 - The primary concern of UL in the evaluation and testing process is consumer safety
 - The product liability issues are the main concern of sales organizations dealing with a non UL approved product
- CFR contains regulations in the FCC section which limit the amount of unintentional or incidental electromagnetic radiation which a consumer product can emit
 - The FCC has full enforcement powers to ensure compliance with their emission specifications
 - Noncompliant products can be removed from the market

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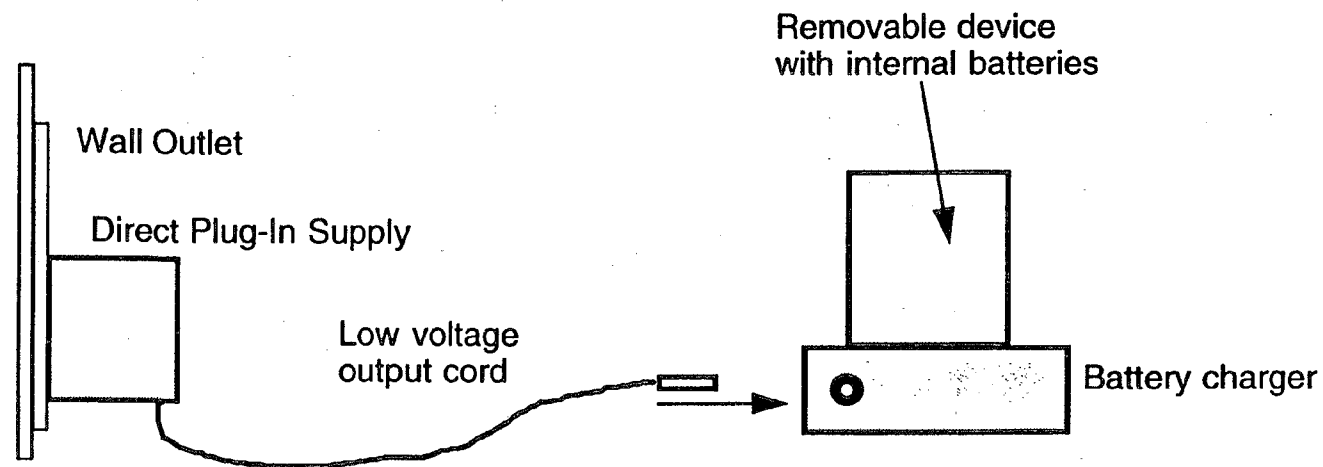
UL approval is based on the issue of whether the product has any hazards to the public in its end application.

- A battery charger or power supply which connects to the power line will require UL approval due to the potential of electrical shock to the user
- The UL Standard by which the charger will be reviewed is dependant on the amount of electrical power delivered to the load and the electrical isolation of the device
- Electrical isolation is achieved by the use of a transformer in the charger which converts the 115 volt line down to a much lower voltage (i.e. 9 volts)
- UL is normally only concerned with the portion of the device that is electrically at the line voltage
- There are two UL standards directed at chargers and power supplies
 - UL Standard 1310 'Direct Plug-In Transformer Units'
 - UL Standard 1012 'Power Supplies'

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UL Standard 1310 'Direct Plug-In Transformer Units'

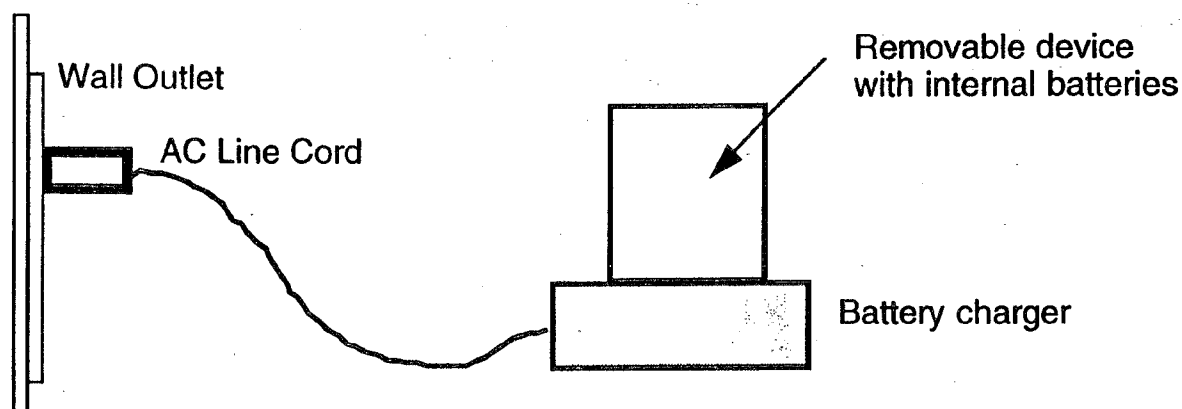
- This standard covers the small supplies and chargers that plug directly into the wall outlet. The output power is delivered to the load by a cord with a low voltage connector
- This type of device must have low output voltage and low output current to the load (<30 Volts & <8 Amps) to qualify
- With this type of supply/charger the consumer is never exposed to the power line voltage only to the transformer isolated low voltage output



Reference No. 48362

UL Standard 1012 'Power Supplies'

- This standard applies to products which contain a line operated power supply inside the product as it is used by the consumer
 - The simplest case is that of a power supply (i.e. battery eliminator)
- Products which have an AC line cord which plugs into the wall outlet and are designed to supply electrical power as a battery charger will be reviewed under this standard
- Another object (the lighter) which plugs into the battery charger and is removed for use, may be subject to review depending on possible hazards to the user



Reference No. 46362

Full disclosure of the design is required in order for UL to evaluate the possible approval of the lighter.

- UL will respect the proprietary nature of a product concept
- In order to evaluate the possible hazards in use, full detailed design and operating information will have to be supplied
- The approval process is typically taking 4 to 6 weeks depending on the backlog in this product area
- Typical power supply approvals cost 3 to 4 thousand dollars

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UL will try to compare the lighter to similar products which due to its unique nature may not be readily identifiable.

- You can assure a favorable outcome by strong documentation support
- Careful presentation of the performance of the heater is important to their perception of risk and hazards
- It is important to assign a technically knowledgeable individual to provide liaison with UL during the process
- It is possible with this short turn around to have the charger approved first and the lighter much later

The Code of Federal Regulations, Section 47 Part 15 dealing with the FCC contains a portion specifically targeted at an intentional, unintentional or incidental radiator which may be operated without an individual licence

- Operation of a radiator that is not in compliance must be licensed pursuant to the provisions of section 301 of the Communications Act of 1934 as amended
- The lighter could be classified as a Class B Digital Device which is marketed for use in a residential environment notwithstanding use in commercial, business and industrial environment (15.3i)
 - examples include home computers, calculators
 - capable of operation while connected to the charger or power supply
- The use of induction heating in the lighter would cause it to be classified as an unintentional radiator (15.3z)

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Digital devices which have no internal frequency higher than 1.705 MHz and do not operate from the AC power or contain provisions to operate from the AC power line are exempted from the specific technical standards and compliance testing (15.103h).

- Accordingly the device does not have to be measured for compliance to the American National Standards Institute (ANSI) C63.4-1992 titled "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 30 Ghz"
 - Based on IEEE July 17,1992 Document # SH15180
- The device is then only subject to the general conditions of operation contained in Parts 15.5 and 15.29 of the CFR Section 47
- The present design of the lighter as a stand alone battery operated device with clock frequencies well below the 1.705 MHz should qualify it for this exemption

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Part 15.5 deals with the possibility of causing interference to others.

- 15.5b "Operation of an intentional, unintentional, or incidental radiator is subject to the conditions that no harmful interference is caused and that interference must be accepted that may be caused by the operation of an authorized radio station, by another intentional or unintentional radiator, by industrial, scientific and medical (ISM) equipment, or by an incidental radiator"
- 15.5c "The operator of a radio frequency device shall be required to cease operating the device upon notification by a Commission representative that the device is causing harmful interference. Operation shall not resume until the condition causing the harmful interference has been corrected"
- Good design practice and attention to conductive shielding on the inside of the case of the lighter should be adequate to prevent "harmful" interference due to the low power level of the digital circuitry

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Part 15.29 deals with the responsibility of the owner or operator of the device to provide information to the FCC.

- The device and any certifications must be made available to the FCC if requested
- Design data showing how the emission has been held down must be made available to the FCC if requested
- The operating instructions and any test data taken during normal operation that confirms compliance with the regulations must be made available to the FCC
- The Commission may from time to time request samples to test at their laboratories in Maryland to confirm the device continues to comply with the regulations

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The compliance issues with both UL and the FCC do not appear to be a roadblock as long as specific design constraints are observed.

- The charger portion of the product can be UL Listed independent of the charger stand and its industrial design if it qualifies under UL 1310 as a wall mount transformer type
- The lighter can be designed to meet the frequency constraints and the limitation to battery only use, in order to qualify for exclusion under the FCC regulations
 - This should be an active objective of your present design program
- Good design practice with the use of conductive coatings, attention to shielding, and attention to possible hazards to the user will facilitate the goal of not having to have the lighter go through either UL or the FCC approval process

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